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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/712,191	11/15/2000	Fumito Takemoto	2091-0222P-SP	8109

7590 07/01/2004
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EXAMINER

BHATNAGAR, ANAND P

ART UNIT PAPER NUMBER

2623

DATE MAILED: 07/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/712,191

Applicant(s)

TAKEMOTO, FUMITO

Examiner

Anand Bhatnagar

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. Applicant's amendment filed on 04/07/04 has been entered and made of record.
2. Examiner withdraws the objection to claim 24 since this claim has been amended.
3. Applicant's arguments filed on 04/07/04 have been fully considered but they are not persuasive.

Applicant's representative in essence argues (paper #6 page 8 2nd paragraph), regarding claims 1, 8, 15, and 24, that the prior art of Tuceryan et al. (U.S. patent 6,044,168) does not teach or suggest performing rotation of a facial template or image. Examiner agrees with the applicant that this feature is not taught by Tuceryan et al. but the claim limitation does not state that all the features of moving, transforming, and rotating are performed on the template as well as the image. What the claim states is "carrying out position matching between the face template and the face area to be extracted, by moving, transforming, and/or rotating the face template and/or the image." Only one feature found would satisfy this claim limitation. The prior art of Tuceryan et al. meets two out of three the features which is moving the template around the image and transforming the template into a multiscale template "transforming" for facial matching/localization (Tuceryan et al.; col. 3 lines 8-26 and col. 5 lines 1-13).

Further applicant's representative argues (paper #6 page 8 3rd paragraph) that the prior art of Holliman fails to teach or suggest the moving, transforming, and/or rotating the face template and/or image according to an input from an input means. These features were disclosed by the main reference of Tuceryan et al.

Applicant's representative further argues (paper #6 bottom of page 8 to top of page 9) that one skilled in the art would not be motivated to combine the teachings of Tuceryan with Holliman to achieve Applicant's claimed invention. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the teaching of displaying two images together is a good method of checking/verifying that the template match being performed on the images is being done correctly and the one with the best correlation is obtained and any changes that need to be performed on the system can be performed or another match performed if needed.

Applicant's representative further argues (paper #6 page 9 lines 4 and 5) that the prior art of Tuceryan and Holliman fail to teach the features of applicant's

claimed invention. Examiner disagrees and refers to the above discussed arguments.

Applicant's representative further argues, on page 9 lines 9-11, that "One of ordinary skill would not modify the system to include intervention by a user." Nowhere in the claim language does it state that a user is involved in the system and intervenes in the system.

Regarding claims 22-24, applicant's representative argues, paper # 6 bottom half of page 9, that the examiner suggested that that changing the color tone of a desired area is to show which region has been analyzed is the intended purpose of applicant's instant invention. Examiner is not giving this as an intended purpose of applicant's instant invention but merely stating one reason as why one skilled in the art would convert a color tone of area in an image, since the claim language does not have a purpose nor has an advantage stated of why the converting of the color of the area in the image is performed and this technique (of color tone conversion) is well known in the art of image processing. There are many reason as for one skilled in the art to convert color(s) tones of an image or just an area in an image, such as the one given by the examiner in his office action, or to perform color correction, or to fit the colors of an image to the gamut of a display/printing device, etc. Further applicant's representative argues that this color tone conversion of the facial area is not performed by the prior art of Tuceryan et al. Examiner agrees with the applicant but this is a well known technique in image processing as discussed above.

Regarding claims 3,10, and 17, applicant's representative argues, that the prior art of Lee and Ranganath ("3D Deformable Face Model for Pose Determination and Face Synthesis", Department of Electrical Engineering, The National University of Singapore, Image Analysis and Processing, International Conference Sept. 1999) does not teach to unsharpen the edges of the image to perform facial matching. Examiner disagrees. Lee et al. discloses to using a deformable image model to detect the face in an image (page 2 under #2. 3D Face Model and under #3. Model Matching and Pose Determination, where a 3D deformable model "template" is used to perform facial recognition and the 3D model is deformed to perform facial matching in an image), this deformation model is read as an unsharpen image.

Lastly, applicant's representative argues (regarding claims 7, 14, and 21), paper # 6 page 10, that none of the cited references teach the feature of "wherein the color different from the color is a complementary color of the skin color. Examiner discussed in the original office action, paper #5, that changing the color in the image is obvious to one skilled in the art in order to distinguish the template from the image more clearly when displayed simultaneously, since no reason is given in the claim language as why it is advantageous to perform this step. As discussed above, regarding claims 22-24, color conversion is a well known technique in image processing and changing the image colors to its complementary colors is also well known especially to print an image because most printers use complementary colors of normal RGB (image data) and

therefore the image colors need to be converted to its complementary colors in order to perform the task of printing the image.

Examiner refers to the rejection below.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A.) Claims 1, 2, 6-9, 13-16, and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tuceryan et al. (U.S. patent 6,044,168) and Holliman et al. (U.S. patent 6,075,557).

Regarding claims 1 and 8: A method of extracting a face area from an image including a human face (Tuceryan et al.; fig. 1 elements 20, 21, and 23 and col. 3 lines 8-13, where the face is localized in an image and localizing a face is read as extracting the face), the face extraction method comprising the steps of:

carrying out position matching between the face template and the face area to be extracted, by moving, transforming and/or rotating the face template and/or the image according to an input from input means (Tuceryan et al.; col. 3 lines 8-26 and col. 5 lines 1-13, where the positions of facial features are determined by correlating a template image to the image using a 11x11 window

and using the result of the correlation of position matching to identify the facial feature in the image. The determination/location of facial features further localizes the face area in the image. Since a 11x11 window is used to correlate facial features implies that the template is moved around the image to find the regions that have the best correlation to the template image).

extracting the face area based on a result of position matching (Tuceryan et al.; col. 4 lines 45-49 and col. 5 lines 10-28, where the face area is determined by template matching/correlation. The determination/localization of the positions of the facial features, such as eyes, mouth, etc. is also read as extracting a face area since these features are regions of a face).

Tuceryan et al. discloses to localize/extract a face in an image(s) by template matching (Tuceryan et al.; col. 3 lines 8-17). Tuceryan et al. further discloses to display the predetermined facial templates (Tuceryan et al.; fig. 4 and col. 4 lines 18-24) and the image(s) (Tuceryan et al.; fig. 6 and col. 4 lines 48-51). Tuceryan et al. do not disclose to display the predetermined facial templates and the image together on a display. Holliman et al. teaches to display an image object/face and the border of an template simultaneously on a display (Holliman et al.; col. 8 lines 55-56 and col. 11 lines 40-50). It would have been obvious to one skilled in the art to combine the teaching of Holliman et al. to that of Tuceryon et al. because they are analogous in object/face extraction from an image using template matching (Hollimann et al.; col. 11 lines 60-63). One in the art would have been motivated to incorporate the teaching, simultaneously

displaying an image and a predetermined template modified to display the whole template and not just the border of a template, of Hollimann et al. to the face localization system of Tuceryon et al. to have a system which would allow an operator/individual to verify that the facial extraction process is being performed accurately and if any discrepancies in the facial extraction process are observed, by the operator, then the system can be finely tuned instantly.

Regarding claims 2 and 9: A face extraction method wherein the step of extracting the face area comprises the steps of:

calculating a degree of matching between the face template and the face area in accordance with the position matching (Tuceryon et al.; col. 3 lines 8-18 and col. 5 lines 1-13, where the template matching /correlation gives a set of correlation values. This set of correlations is read as calculating a degree of matching.); and

extracting the face area based on the degree of matching (Tuceryon et al.; col. 3 lines 15-18 and col. 5 lines 10-13).

Regarding claims 6 and 13: A face extraction method wherein the face template has a different color from a skin color (Tuceryan et al.; fig's 4 and 5 where the templates are edge maps and/or wire frame models. These edge maps are read as templates having different color than skin since the edge maps are lines, such as black or white lines, in a background defining an object to be extracted from an image. The black or white color of the templates is read as a color different from skin color).

Regarding claims 7 and 14: A face extraction method wherein the color different from the skin color is a complimentary color of the skin color (Tuceryan et al.; figs 4 and 5 where the templates are edge maps and/or wire frame models. These edge maps are read as templates having different color than skin since the edge maps are lines, such as black or white lines, in a background defining an object to be extracted from an image. The black or white color of the templates is read as a color different from skin color).

Tuceryan et al. discloses to have templates that have a different color than skin color, as discussed above. Tuceryan et al. does not disclose to have the color of the template be a color which is complimentary of the skin color. It would have been obvious to one skilled to design the template wherein the color of the object/face in the template can be any color so that the simultaneous display of the template and the image can be distinguished more clearly.

Regarding claims 22 and 23: A method of carrying out image processing on the face area extracted by using the face extraction method to the Image processing method comprising the step of:

converting a color tone of a desired area including the face area to a color tone of a predetermined target image.

Tuceryan et al. discloses to have facial templates which are composed of edge maps and/or wire frame models (Tuceryan et al.; figs 4 and 5 where the templates are edge maps and/or wire frame models. These edge maps are read as templates having different color than skin since the edge maps are lines, such

as black or white lines, in a background defining an object to be extracted from an image. The black or white color of the templates is read as a color different from skin color). Tuceryan et al. does not disclose to convert a color tone of a desired area including a face area to a color of a predetermined target image. It would have been obvious to one skilled in the art to convert the templates or images or face regions in the images to a specific predetermined color tone to show that a specific region of the image has been analyzed and/or the object/face located within the image.

Regarding claim 15: It is rejected for the same reason as claims 1 and 8 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Regarding claim 16: It is rejected for the same reason as claims 2 and 9 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Regarding claim 20: It is rejected for the same reason as claims 6 and 13 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Regarding claim 21: It is rejected for the same reason as claims 7 and 14 above and for the following limitation of: a computer readable recording medium

(Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Regarding claim 24: It is rejected for the same reason as claims 22 and 23 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

B.) Claims 3-5, 10-12, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tuceryan et al. (U.S. patent 6,044,168) as modified by Holliman et al. (U.S. patent 6,075,557) and further view of Lee and Ranganath ("3D Deformable Face Model for Pose Determination and Face Synthesis", Department of Electrical Engineering, The National University of Singapore, Image Analysis and Processing, International Conference Sept. 1999).

Regarding claims 3 and 10: A face extraction method wherein the step of calculating the degree of matching further comprises the step of:

generating unsharp images of the face template and an area corresponding to the face template in the image; and

calculating the degree of matching between the unsharp images.

Tuceryon et al. and Holliman et al. both teach to use perform template matching to locate/extract an object/face in an image. Neither one teaches to use 3D facial templates nor unsharpening images of the face template for template matching. Lee and Ranganath teach to use 3D models "templates" as well as

deforming “unsharpening” the models “templates” to perform template matching for facial recognition (page 2 under #2. 3D Face Model and under #3. Model Matching and Pose Determination, where a 3D deformable model “template” is used to perform facial recognition and the 3D model is deformed to perform facial matching in an image). It would have been obvious to one skilled in the art to combine the teaching of Lee and Ranganath to that of Tuceryon et al. as modified by Hollimann et al. because they are analogous in facial recognition in an image. One in the art would have been motivated to incorporate the teaching of a using 3D models “templates” as well as deforming “unsharpening” the models “templates” for template matching/correlation, of Lee and Ranganath to that of Tuceryon et al. as modified by Hollimann et al. in order to identify a face in an image taken into consideration the different possible facial poses that may take place in a 3D setting (Lee and Ranganath; page 1 under #1 Introduction, last two lines of left column and first two lines in right column).

Regarding claim 17: It is rejected for the same reason as claims 3 and 10 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Regarding claims 4 and 11: A face extraction method wherein the face template has a three-dimensional shape (Lee and Ranganath; page 2 under #2. 3D Face Model, where a 3D deformable face model “template” is used).

Regarding claims 5 and 12: A face extraction method wherein the three-dimensional shape is formed by a three-dimensional wire frame (Lee and Ranganath; fig. 1 block d, where the model is a wire frame model).

Regarding claim 18: It is rejected for the same reason as claims 4 and 11 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Regarding claim 19: It is rejected for the same reason as claims 5 and 12 above and for the following limitation of: a computer readable recording medium (Tuceryon et al.; col. 2 lines 63-65, where the process is performed on a computer).

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand Bhatnagar whose telephone number is (703) 306-5914, whose supervisor is Amelia Au whose number is 703-308-6604, group fax is 703-872-9306, and Tech center 2600 customer service office number is 703-306-0377.

AB

Anand Bhatnagar

Art Unit 2623

June 28, 2004


SAMIR AHMED
PRIMARY EXAMINER